STAR 2006: NOAA Ship *David Starr Jordan*
Weekly Science Report

Robert L. Pitman, Cruise Leader
24 August 2006

Science Summary: 17-23 August 2006

This week we ran a straight line 1000 nm SW of Mazatlan, Mexico - water blue, bottom deep, and relatively little to look at: mainly small gangs of striped dolphins and occasional schools of spotters and/or spinners. Our weather ran the gamut for the ETP: one day starts with a shell-pink sunrise over a liquid amber sea; the next was a frothy Beaufort 6 sea state that kept the mammal observers (but not those stalwart birders!) hunkering below decks. Near the shelf break we encountered several giant, roiling schools of spinner dolphins the readily came over to the bow of the ship. We recorded them as 'unidentified spinner dolphins' because although they were quite similar in appearance to the eastern spinners, their location and behavior was identical to centroamerica spinners, a long, lanky, neritic form found a lot further south. These intermediate-looking animals were probably 'Tres Marias' spinners, another, less-well differentiated neritic form. Tricky.

Turtle density gets thin offshore also: on one of our exceptionally calm days we saw only four individuals, comprising two mating pairs (think two large coffee cups stacked upside down). You have to wonder how so few turtles can manage to find each other out here. Maybe the female douses the water with an irresistible chemical attractant (pheromone), or possibly this was the result of an extended honeymoon. Adult male turtles grow a massive hooked thumbnail and a similarly hooked toenail that they use to attach themselves to the back of the female like a luggage rack: he decides when the date is over. We captured one of the pairs and the female had some well-developed *Lepas* barnacles on her shell suggesting that they could have been locked in love's embrace for weeks, or longer, and possibly they drifted far offshore with the current. This challenge of locating a mate far offshore is a subject of enduring interest to all sea-going biologists.

Rufus, our pet triggerfish, survived the in-port just fine and he has a constant companion now. We put a 6" lineated remora (*Phtheirichthys lineatus*) in the tank that was attached to a turtle we caught. The remora has a suction cup on the top of its head that it uses to attach to the underside of its 'host' (currently Rufus); when we put food in the water the remora drops off briefly to feed, but then re-attaches immediately. The remora gets a free ride and some protection out of the arrangement; Rufus gets nothing except some additional weight to carry around and a food sink. The remora in this case is perhaps more of a bother than a parasite, although the dolphins in some of the areas that we survey (especially around the Galapagos Islands) often carry 3-4 very large remoras that probably weigh up to 5 lbs apiece: a very significant burden. If these large remoras leave telltale marks at their attachment sites, it could prove useful for our marine mammal population identity group (e.g., Hickies as bio-indicators of pelagic dolphin stocks. 2009. B. Taylor *et al.* Science 1026:184-195.)

Bring out your dead: We had a serious outbreak of Mazatlan's Revenge the day after we

departed port: sinus infections and/or body fluid management issues were reported by a mammal observer, a bird observer, the turtle lady and our oceanographer (at least the diversity was healthy), as well as some crew and officers. Most of them shook off their maladies after only 24 hr but our CTD has been in the garage for 2 days in a row now, and counting: Get well, Candy! We are doing nightly net tows off the port side - a bit cumbersome and time consuming but it should get us through to Costa Rica where we will get another shot at a replacement part for the starboard winch. We also have some rather elaborate CO_2 monitoring equipment onboard that was installed by personnel from PMEL (Seattle). Despite being 'virtually maintenance free,' our electronics technicians (Kim and now Jim Anthony) and Candy have put in numerous hours and had little success getting this thing up and running. It is currently shut down and a technician will come down from PMEL to deal with it during our next in-port.

Our MVP for the cruise will have to go, once again, to Juan Carlos Salinas; he has become a one-man scientific expedition, indispensable to just about every aspect of our project. Perhaps we should just call it the JCS Overachiever Award and give it to someone else for a change. We're lucky to have him.

Sightings and Effort Summary for Marine Mammals

Date	Start/ Stop Time	Position	Total nm	Average Beaufort
081706	1134	N23:02.11 W106:25.19	48.7	3.3
	1933	N22:19.72 W106:40.16		
081806	0655	N21:25.06 W107:23.97	89.3	4.1
	1937	N19:59.64 W108:31.32		
081906	0701	N19:00.01 W109:19.34	77.7	4.1
	1941	N17:38.82 W110:13.74		
082006	0704	N16:45.68 W111:05.82	83.0	2.5
	1923	N15:15.94 W112:14.51		
082106	0725	N14:11.20 W113:05.82	83.1	2.5
	1947	N12:41.88 W114:11.37		
082206	732	N11:27.64 W115:10.66	49.1	3.0
	1948	N10:24.69 W115:42.81		
082306	0739	N09:28.23 W114:38.47	10.6	5.6
	1359	N08:58.83 W113:57.97		

Code	Species	Number of Sightings
002	*Stenella attenuata* (offshore)	17
003	*Stenella longirostris* (unid. subsp.)	2
010	*Stenella longirostris orientalis*	17
013	*Stenella coeruleoalba*	13
015	*Steno bredanensis*	4
017	*Delphinus delphis*	2
018	*Tursiops truncatus*	2

Code	Species	Number of Sightings
049	*Ziphiid* whale	1
061	*Ziphius cavirostris*	1
077	unid. dolphin	2
078	unid. small whale	2
Total		63

Photography (Cornelia Oedekoven and Laura Morse)

This week we were able to add another eleven dolphin schools to our photographic data base. Browsing back through the images it was very reflective of the track line that we covered in these past seven days: leaving Mazatlan, on Day 1, taking us farther and farther offshore during the next five days (and no images on day 7 due to Beaufort 6). The week started out with single species and mixed spinner and spotter schools. The dolphins from nearshore waters approached to ride the bow, giving us plenty of opportunities to photograph them. Then we added some beautiful rough-toothed dolphin images, some showing them approaching the bow (with the eye of the dolphin visible through the water), and others showing a dolphin playing at the surface with a fish in its mouth. After that, the images are useful perhaps only for species confirmation, if that, as we photographed schools of striped or spinner dolphins running away offering their tail ends or distant side views for us to photograph.

Code	Species Name	Weekly photographs		Total Photographs	
		Individual	Schools	Individuals	Schools
002	*Stenella attenuata* (offshore)		2		9
003	*Stenella longirostris* (unid.)		2		5
010	*Stenella longirostris orientalis*		2		2
002/010	*St. l. orientalis/a* (offshore)		1		2
013	*Stenella coeruleoalba*		2		2
015	*Steno bredanensis*		2		5
017	*Delphinus delphis*				10
018	*Tursiops truncatus*				9
021	*Grampus griseus*				5
036	*Globicephala macrorhynchus*				1
046	*Physeter macrocephalus*			20	
049	Ziphiid whale				1
063	*Berardius bairdii*				3
072	*Balaenoptera edeni*				1
074	*Balaenoptera physalus*			2	
075	*Balaenoptera musculus*			15	
090	*Stenella attenuata* (unid.)				1
099	*Balaenoptera borealis/edeni*				5
Total		0	11	37	61

Biopsy (Juan Carlos Salinas and Ernesto Vásquez)

Species	Common Name	Weekly		Total	
		Samples	Takes	Samples	Takes
Balaenoptera edeni	Byrde's whale	0	0	3	3
Balaenoptera musculus	Blue whale	0	0	8	16
Delphinus delphis	Short-beaked common	0	0	15	32
Globicephala	Short-finned pilot whale	0	0	8	19
Physeter macrocephalus	Sperm whale	0	0	8	8
Stenella attenuata	Pantropical spotted	0	0	12	23
Stenella coeruleoalba	Striped dolphin	0	0	1	3
Stenella longirostris	Eastern spinner dolphin	0	0	6	20
Stenella longirostris	unidentified spinner	21	33	21	33
Steno bredanensis	Rough-toothed dolphin	2	2	2	2
Tursiops truncatus	Bottlenose dolphin	1	2	14	24
Total		24	37	98	18

Bird Buzz (Rich Pagen and Chris Cutler)

A crossing from coast to seaward, our furthest offshore track lines yet, and some impressive bird flocks with dolphin schools all contributed to what turned into a banner week for this team of seabird observers. The 29 species we encountered ranged from neritic dwellers such as Black Tern, Black Storm-Petrel and Townsend's Shearwater to pelagic ones such as Bulwer's and Kermadec Petrels, their ranges only barely reach this far to the east.

Bird flocks over dolphin schools were the staple, with Juan Fernandez Petrels and Wedge-tailed Shearwaters stepping up as the dominant force in these manic, swirling masses of feathers. High above the chaos, clouds of Sooty Terns drifted like smoke, while Masked Boobies plunged in pursuit of flyingfish. As we approached each flock and our view improved, it was like clockwork that some assortment of less common species would miraculously appear, seemingly out of nowhere. These included Christmas Shearwater, Arctic Tern, Pomarine Jaeger or the odd "gadfly petrel" such as the single Stejneger's Petrel encountered on the 21st. Finally, history teaches us that just when we think we have seen everything in the flock, a lone Pink-footed Shearwater will appear, and this week was no different.

Other birds of interest were Nazca Booby, Harcourt's Storm-Petrel and a calling lone Wandering Tattler which circled the ship then vanished.

In the Marine Debris Department this week, the old adage "the leaf doesn't fall far from the tree" certainly summed up the drop off in flotsam as we distanced ourselves from the Mexican coast. However, in the open ocean where encounters with sizeable pieces of marine debris are often few and far between, some types of wildlife seem to congregate around any floating objects when their paths cross; perhaps for cover, perhaps for company, or maybe they just find it interesting to stare at something else besides featureless blue sea all day. Examples this week included a Brown Booby sitting on a plastic container, yet another sea turtle tangled in a woven nylon storage bag (the ubiquitous *costal*), and a small group of rough-toothed dolphins playing with a wooden dowel.

Turtle Operations (Lindsey Peavey, *et al.*)

This was a relatively slow week for turtles; they seem to be much like the dolphins out here 850 miles from shore: shy and evasive. We saw a fair number but capturing them from the small boat proved difficult. Other than the mating pairs bobbing in their own world, they are quick to dive. The highlight was definitely rescuing "Juanito" - a small juvenile olive ridley (23 cm long) Juan Carlos picked up hopelessly entangled in plastic. After cutting off the pieces around his neck and all four flippers, Juanito happily swam off exercising his new range of motion. On 22 August, we preformed the first lavage (flushing of stomach contents) of STAR 2006 to confirm that a young female olive ridley was feeding on *Porpita porpita* at the time of capture. Bob describes these turquoise jellies as being similar to 'cheetos' - no nutritional value, but when they're around you eat them by the mouthful. We are creeping closer to the coast and next week we expect to encounter more turtles.

Species	**Common name**	**Number sampled**	
		Weekly	**Total**
Caretta caretta	Loggerhead	0	8
Lepidochelys olivacea	Olive ridley	5	37
Total		5	45

Squid Ops (Iliana Ruiz-Cooley)

We observed squid at the sea surface every night this week and managed to catch 15, mostly with the dipnets. Small- to medium-sized *Dosidicus gigas* dominated in some areas, while *Sthenoteuthis oualaniensis* was dominant in others. On 19 August, we observed and caught both species in the same area. Interestingly, we captured two *S. oualaniensis* in the process of feeding: one on a tiny squid and the other on a lanternfish; an excellent example of how squid are predators on many different types of fish, crabs and even other squid species!

Later this leg, we will arrive at some planned stations in the waters off southern Mexico. Until then, we continue opportunistic jigging every night with a goal of capturing at least two squid each night. However, our jigs seem to have been less than appetizing the past three nights, and we haven’t been able to hook a single squid. But this coming week we hope to put many more squid in the position where they have to ask, “To bite or not to bite?” For sure, we will say… Just do it!

Fish Sampled for Diet and Isotope Analysis

Species	Samples	
	Weekly	Total
Yellowfin Tuna	5	13
Skipjack*	4	9
Wahoo	1	3
Mahi Mahi	1	6
Total	11	31

* Includes black skipjack

Oceanographic Operations (Candy Hall)

Date	**CTD**	**XBT**	**Bongo tow**	**Manta tow**
17 Aug	1	1	1	1
18 Aug	2	3	1	1
19 Aug	2	3	1	1
20 Aug	2	3	1	1
21 Aug	2	3	1	1
22 Aug	0	2	1	1
23 Aug	0	5	1	1
Total	9	20	7	7